SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS
MAGLEV DEPLOYMENT PROGRAM

PART 2 - MILESTONE 7

SUMMARY OF PRELIMINARY ENGINEERING FOR IOS

August 2006

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MAGLEV
TURNING THE VISION INTO REALITY

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I. Introduction

The preliminary engineering design identified in the Phase 2 SCAG Maglev Deployment Program has been completed. This report summarizes the project and the work efforts related to the preliminary engineering of the alignment, development of station concepts and maintenance facilities, capital cost estimates and public involvement plan. The report is Milestone Seven in the Part 2 work element. More detailed information for the individual components can be found in the previous milestone reports:

- Preliminary Engineering Analysis
- Preliminary Design of Stations
- Refined Cost Estimation
- Outreach and Communications

This report contains six sections, including introduction, background, and a section devoted to summarizing each of the four key components of study. The sections are:

1. Introduction
2. Program History
3. Preliminary Engineering Analysis
4. Preliminary Design of Stations
5. Refined Cost estimate
6. Outreach and Communications

Section 1, Introduction, describes the purpose of the report and the layout of the document. Section 2 provides a brief history of the maglev program. Section 3 summarizes the results of the preliminary engineering work. Section 4 provides a summary of the station and maintenance facility concepts. Section 5 highlights the results of the capital cost estimates for the project. And finally Section 6 describes the outreach conducted in this phase of the program.

II. Background

Maglev Program History

United States Government Agencies and Legislators have been envisioning methods to realize a high-speed ground transportation system for several decades. The National Maglev Initiative (NMI) was formed in April of 1990 and included United States Department of Transportation, U.S. Army Corps of Engineers, Department of Energy and other agencies to conduct and coordinate further research and evaluate maglev technology as a means to improve surface transportation. NMI also determined the appropriate role for the Federal Government in advancing the technology.[1] After many years of careful analysis and study, the conclusion was that maglev is a viable technology for deployment in the U.S. In 1998, the Transportation Equity Act for the 21st Century (TEA-21) established the Maglev Deployment Program to analyze, plan, and build a maglev system in the U.S.

During this period, the Southern California Association of Governments (SCAG) was looking for an innovative technology to address a number of significant issues facing the region. The issues included the need for high-speed, high capacity travel for a large dispersed region, air quality requirements that require a non-polluting means of transportation, the ability of a system to integrate with land use and focus growth, the ability to develop an industry to help replace lost manufacturing jobs in the region, the need for a fast and reliable means to link regional airports and make aviation decentralization possible, and finally, a financially sustainable system capable of operating without government subsidies. Through the process of very thorough evaluation, starting with the SCAG Regional Transportation Plan (RTP) in 1998 and a number of studies and RTPs since then, SCAG identified maglev as a preferred technology.

Under TEA-21, the Department of Transportation initiated a competition to plan and implement a maglev project within the United States. Applications for the projects were solicited from various states and in May 1999, seven projects were selected to participate in the program. The seven selected projects included:

- Pittsburgh, Pennsylvania
- Baltimore, Maryland to Washington D.C.
- Atlanta, Georgia
- Port Canaveral to Kennedy Space Center and Space Coast Regional Airport, Florida
- New Orleans, Louisiana
- Las Vegas, Nevada to California State Line
- Los Angeles, California

In June, 2000, SCAG submitted the Southern California Maglev project description to the Federal Government for further funding and development. The proposed project was to provide high-speed maglev service between major activity centers in high-density, fast growing urban areas. The project study area extended between Los Angeles International Airport (LAX), West Los Angeles, Downtown Los Angeles at the Los Angeles Union Passenger Terminal (LAUPT or better known as Union Station), San Gabriel Valley, Ontario International Airport (ONT), Riverside, San Bernardino and March Inland Port (MIP). The project length was approximately 92 miles and connected three counties together – Los Angeles, Riverside and San Bernardino.

The SCAG project was considered to be the best technical project in terms of application of the technology, local need and consistency with regional planning efforts. However, the SCAG program lacked political support and ultimately did not make the short list in the government down selection process. Federal Government representatives stated (or perhaps indicated) that the project was too ambitious in scope as an initial starter program for maglev. They indicated that the length of the system was too long to use as a test application of the technology and suggested an identification of a smaller Initial Operating Segment (IOS). Ultimately, the Federal program stalled as the money earmarked in

[1] Final Report on the national Maglev Initiative (NMI), September 1993.

TEA-21 for maglev deployment was never made available to any of the short listed projects in the United States.

IOS Selection

Despite the outcome of the Federal program, SCAG continued to study the application of the technology. This was due to the continued development of the technology, both in the United States and overseas, and the need for a high-speed transportation solution for the region. Further financial analysis indicated that the program has the potential to be financially viable and self-sustaining in the region. This led to the continued study of the maglev technology along with other available technologies[2] and eventually a selection by the SCAG Regional Council (RC) in 2002 of an IOS for the system. The IOS system is approximately 54 miles long that connects West Los Angeles to LAUPT, the San Gabriel Valley and Ontario Airport. The vision is for this to be the initial starting point to prove the technology and operate the system in a manner to address some of the challenges to the program and the region including aviation decentralization and financial sustainability.

SCAG Maglev Deployment Program

Currently, the SCAG Maglev Deployment Program is in the second phase of development. The first phase was completed by the Lockheed Martin consultant team in May 2003. The work included predeployment studies, financial and private/public partnering investigations, and the selection of the IOS. The second phase of the program, the current work effort, is focused on the development of enhanced engineering and cost estimating for the system. Detailed plans and profiles are developed for the alignment options, layout concepts are developed for the intermodal stations and maintenance facilities, operational analysis, capital and Operations and Maintenance (O&M) cost estimates and high-level stakeholder outreach are all components of this second phase work. This report details the preliminary engineering of the IOS in the Phase 2 work effort.

[2] LAX-PMD High Speed Ground Access Study, IBI Group, November 2001

III. Preliminary Engineering Analysis Summary

The project being summarized is a preliminary engineering of an Initial Operating Segment (IOS) of high-speed magnetic levitation (maglev) system connecting Ontario Airport with West Los Angeles. The length of the system is approximate 56 miles with the variations in length due to the alignment option. The system consists of four stations: Ontario Airport, San Gabriel Valley, Los Angeles Union Passenger Terminal (LAUPT or better known as Union Station). The system is a fully elevated design in order to maintain high speed and utilize existing public rights of way.

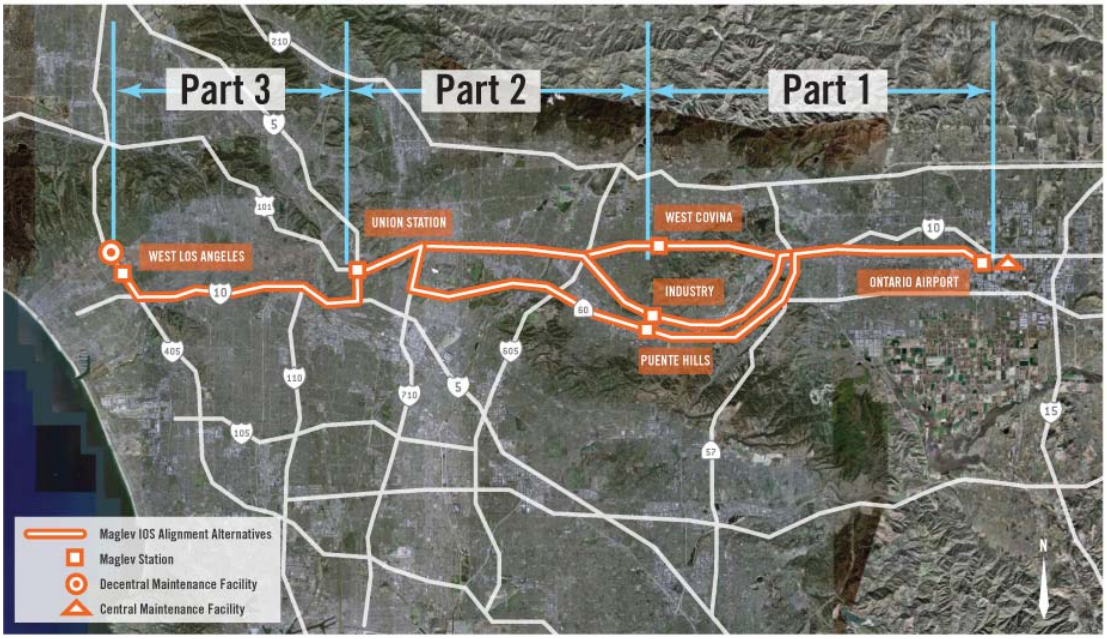
Phase 2 Program Parts

Due to funding requirements, the Phase 2 engineering effort divided the Initial Operating Segment into three parts. The three program parts are summarized as follows:

- **Part I:** West Covina to Ontario International Airport (19 to 21 miles depending on alignment), with two stations: one in Ontario Airport and the other in West Covina or the City of Industry. Part I includes alignment options on the I-10, SR-60, and UPRR alignment alternatives.

- **Part II:** Los Angeles Union Passenger Terminal to West Covina (18 to 20 miles depending on alignment), with a station in Los Angels Union Station. Part II also includes alignment options on the I-10, SR-60, and UPRR alignment alternatives.

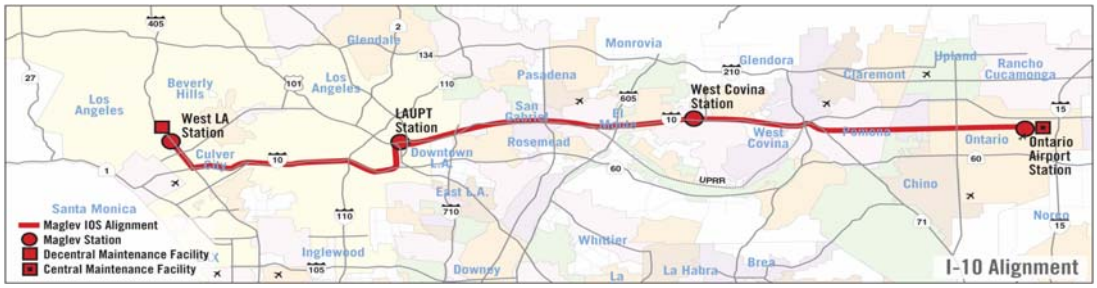
- **Part III:** West Los Angeles to Los Angeles Union Passenger Terminal (17 miles), with a station in West Los Angeles. Part III includes a single alignment on the I-10. This was identified and adopted by the SCAG Regional Council as currently the only acceptable corridor to connect Downtown Los Angeles with West Los Angeles for maglev.



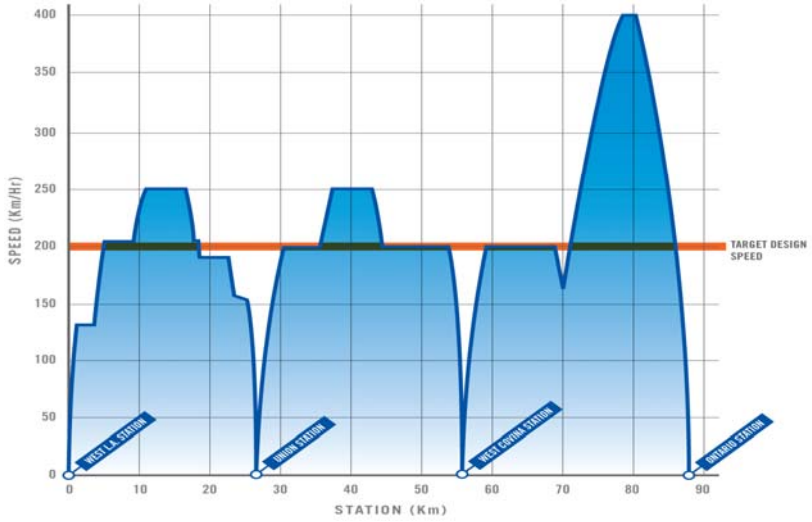
The resulting corridor options formed by connecting the three parts together into possible alignments are summarized as follows:

I-10 Alignment

- This alignment is approximately 54.0 miles long and connects West Los Angeles to Downtown, to West Covina and Ontario. The alternative utilizes the Interstate 10 (I-10) freeway corridor for the majority of the length, but also utilizes existing railroad corridors within Downtown Los Angeles, Pomona, and Ontario. From West Los Angeles, it follows the I-405 freeway to the I-405/I-10 interchange area where it transitions to the I-10 freeway going east. The alignment continues east along I-10 to the Los Angeles River, where it turns north and connects to Union Station in Downtown Los Angeles. From Downtown Los Angeles it connects to West Covina along the I-10. From West Covina, the alignment continues east along the I-10 and SR-71 freeways to the UPRR corridor within the City of Pomona. Here the alignment transitions into the UPRR corridor and continues east to Ontario Airport.



- The total travel time between the West Los Angeles and Ontario Airport stations is 33.5 minutes, which results in an average speed of 98 mph (156.9 kph) including station dwell times. The top speed along the alignment is 250 mph (400 kph), which is achieved between the West Covina and Ontario Airport stations. The straight nature of the alignment along the UPRR corridor east of SR-71 within Part 1 allows the Maglev technology to maximize its speed capabilities.

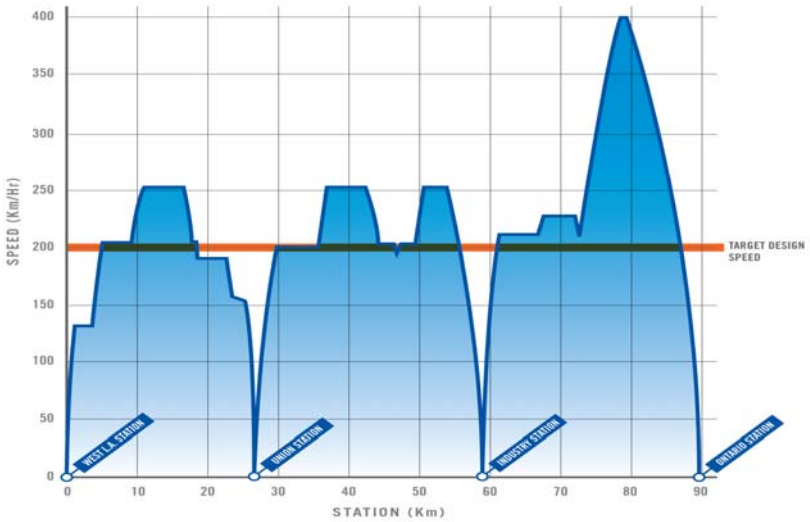


UPRR Alignment

- This alignment is approximately 56.4 miles long and connects West Los Angeles to Downtown, the City of Industry and to Ontario. From the West Los Angeles station to the Valley Boulevard interchange along I-10 within the City of El Monte, this alignment is identical to the I-10. At this

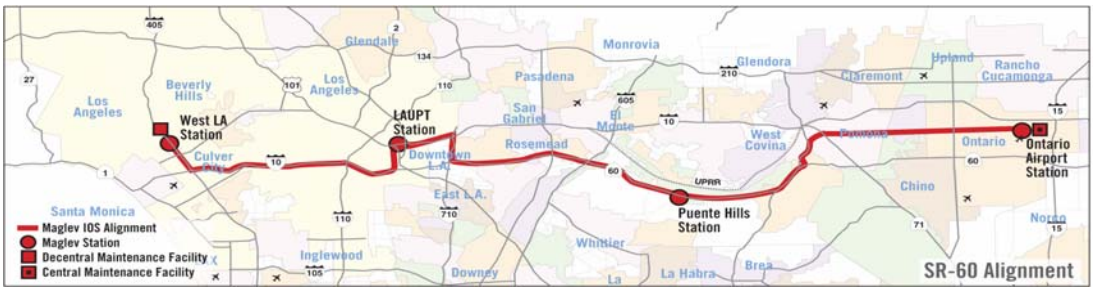
interchange, the UPRR alignment transitions into the Valley Boulevard median and follows Valley Boulevard and the Union Pacific Railroad (UPRR) right-of-way (ROW) through the San Gabriel Valley into Ontario. East of SR-71 to the Ontario Airport station, the UPRR alignment is identical to the I-10 alignment.

- The total travel time between the West Los Angeles and Ontario Airport stations is 33.9 minutes, which results in an average speed of 100 mph (161.2 kph) including station dwell times. The slightly greater travel time compared to the I-10 alignment is attributed to the longer alignment length. The top speed along the alignment is 250 mph (400 kph), which is achieved between the West Covina and Ontario Airport stations.

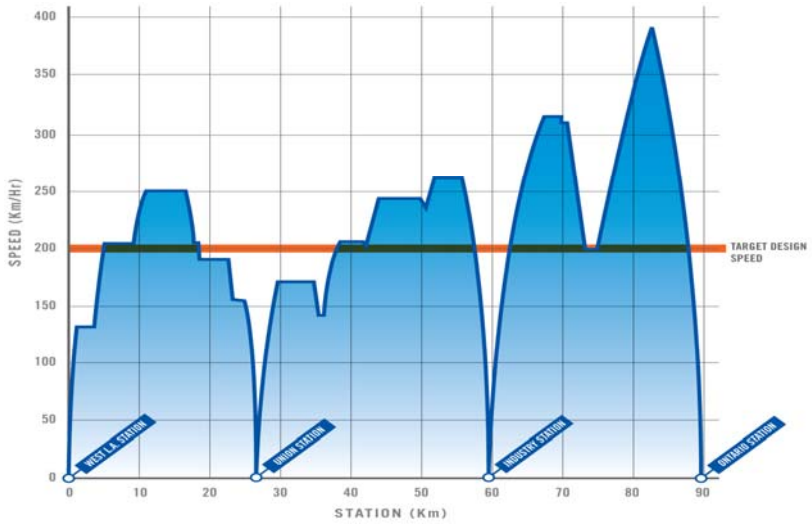


SR-60 Alignment

- This alignment is approximately 58.4 miles long and connects West Los Angeles to Downtown, to City of Industry/Puente Hills and Ontario. From the West Los Angeles station to the I-10/I-710 interchange east of Downtown Los Angeles, this alignment is identical to the I-10. At the I-710 interchange the alignment transitions to the south along the I-710 corridor and then to the east along the SR-60 and SR-57 corridors through the San Gabriel Valley. North of the Temple Avenue interchange along SR-57, the alignment transitions east into the Metrolink railroad corridor within the City of Pomona. East of the merge of the UPRR and Metrolink railroad corridors to the Ontario Airport station, the SR-60 alignment is identical to the I-10 alignment.



- The total travel time between the West Los Angeles and Ontario Airport stations is 34.8 minutes, which results in an average speed of 100 mph (161.2 kph) including station dwell times. The greater travel time compared to the I-10 alignment is attributed to the longer alignment length. Although almost 5 miles longer than the I-10 alignment, the overall travel time increase between West Los Angeles and Ontario is less than 1 minute. This can be attributed to the higher top speed, 260 mph, that is obtained along the SR-60 corridor between the LAUPT and Puente Hills stations.



Design Approach

The design approach used for the development of the preliminary engineering of the IOS was fundamentally a balancing act between the need to optimize performance and to minimize impact and costs. The design approach used the following considerations and the details are summarized in the milestone report.

- Use of Public Rights of Way
- Develop Fully Elevated Alignment
- Maximize Speed
- Minimize Impacts
- Minimize Costs

Base Information

Design of the IOS alignment considered the following base information developed through a combination of data research and new mapping information. The information is summarized in detail in the milestone report.

- Geotechnical Information
- Base Mapping
- Aerial and Topographical Data
- Right of Way Mapping
- Utility Identification

IV. Preliminary Design of Stations

Stations

Maglev stations are key regional transportation facilities designed to provide access for high volumes of passengers. The maglev stations will provide regional and local intermodal connections, as well as national and international connections to passenger facilities at the Ontario International Airport and Los Angeles Union Station.

The aesthetic features of the stations are intended to reflect the intrinsic values of the Maglev system: advanced technology, movement, and speed. The conceptual design calls for open-air stations with natural light and ventilation to take advantage of the mild Southern California climate.

A “family” of stations is proposed for the Initial Operating Segment. These stations would share a common visual identity, structural, and functional elements. Each site-specific station design is based on an appropriate prototype, adjusted to fit the local conditions.

Four stations are proposed for the Initial Operating Segment:

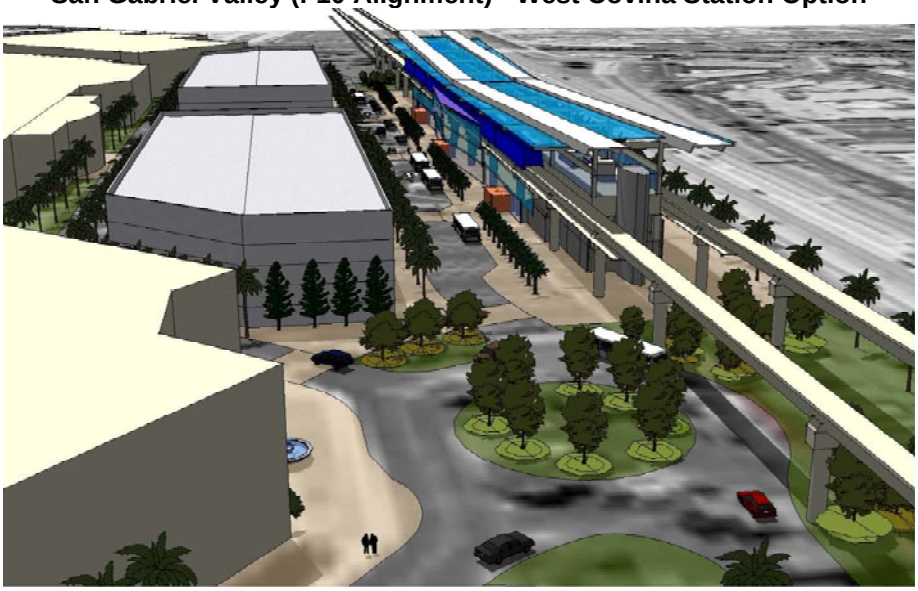
Ontario International Airport Station

This station is proposed to be located north of the existing airport terminal. The station is designed for seamless integration with the Ontario International Airport and various modes envisioned for the stations including future light rail service serving local destinations within San Bernardino County.

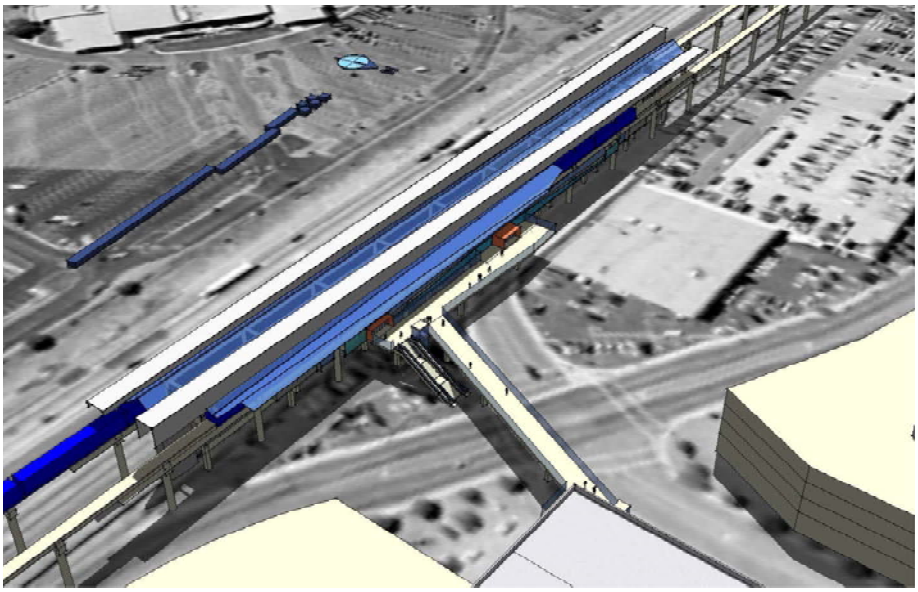
San Gabriel Valley Station

This station would provide access to the growing residential communities and major commercial destinations of the San Gabriel Valley. Depending on the alignment, there are three alternative sites for the San Gabriel Valley Station: one in West Covina on the San Bernardino Freeway (I-10) alignment, and two in the City of Industry on the Union Pacific Railroad (UPRR) and Pomona Freeway (SR-60) alignments. Conceptual designs are provided for all three potential station sites at the request of stakeholders, who ultimately will select one of the three alternative sites for final design and construction.

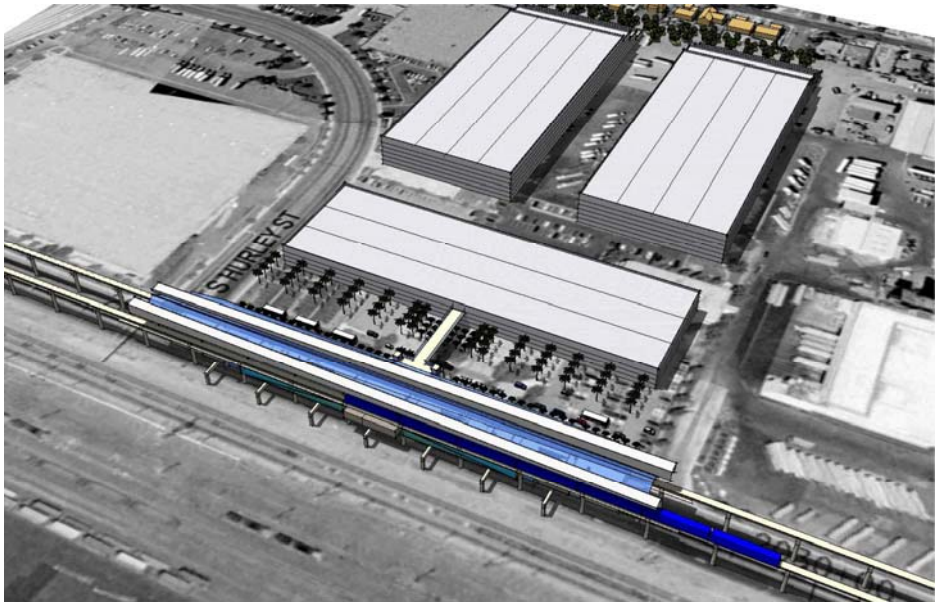
San Gabriel Valley (I-10 Alignment) - West Covina Station Option



San Gabriel Valley (SR-60 Alignment) - City of Industry/Puente Hills Station Option

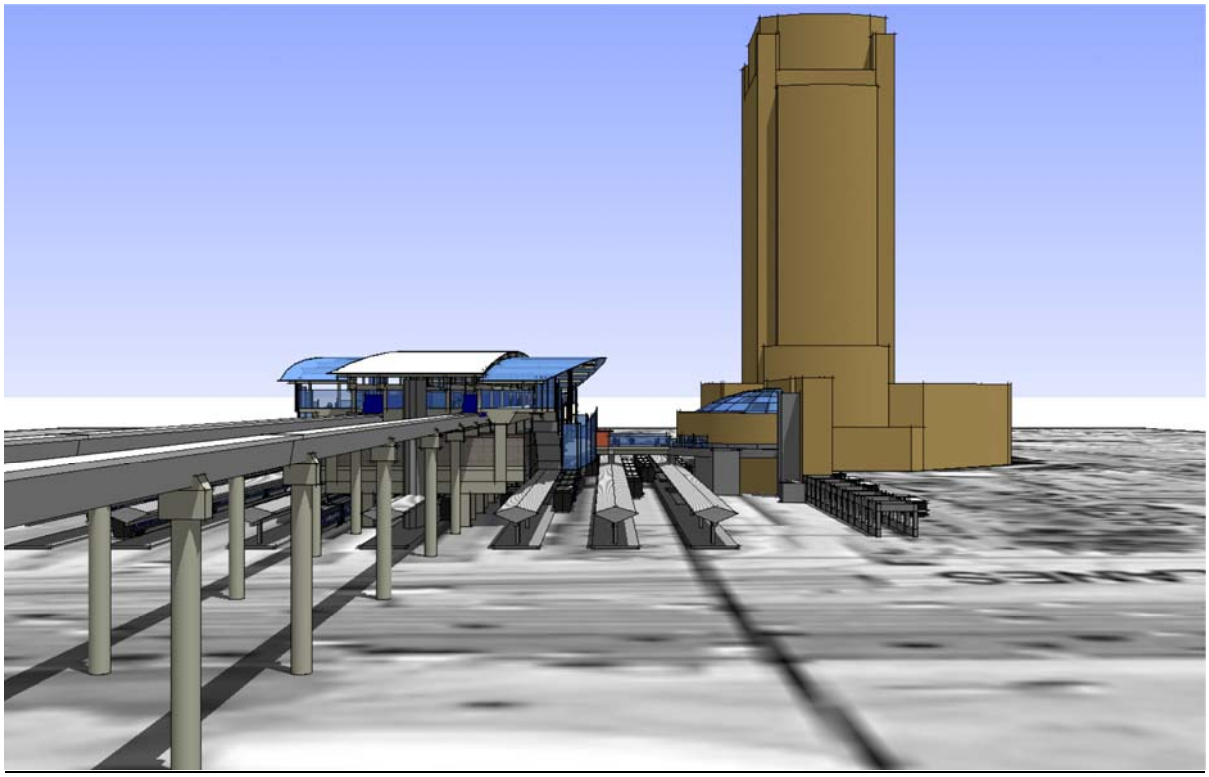


San Gabriel Valley (UPRR Alignment) – City of Industry Station Option



Los Angeles Union Station

Union Station is Southern California's most important intermodal surface transportation hub. Its central location provides convenient access to Downtown Los Angeles. Union Station provides intermodal connections to two Metro Rail lines, six Metrolink commuter rail lines, four Amtrak long-distance rail routes, express buses serving the El Monte and Harbor Transitways, and numerous local bus routes.



West Los Angeles Station

This station would serve the major educational, recreational, cultural, and commercial attractions of West Los Angeles and surrounding communities. The complexities of locating a maglev station in this area will require further study and coordination with stakeholders. Currently SCAG has a separate study devoted to identifying a potential multi-modal transit hub in the area that may include a high-speed rail station. For the purpose of this study, two alternatives have been developed that can provide bookend concepts for the purpose of preliminary engineering and costing. Both concepts are located near the interchange of the San Diego Freeway (I-405) and Wilshire Boulevard.

West Los Angeles - Veterans Administration Station Option

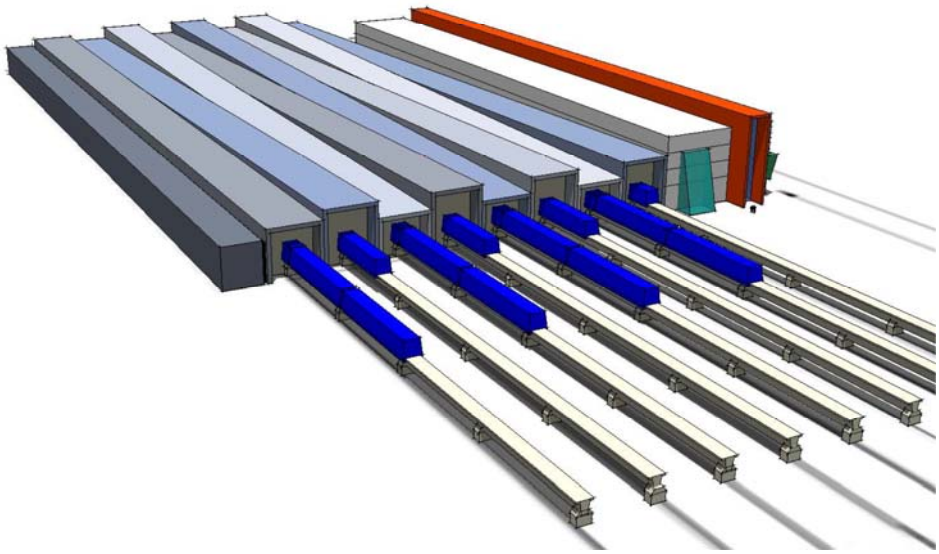
West Los Angeles - Cotner Avenue Station Option

Maintenance Facilities

The Maglev Initial Operating Segment (IOS) includes two maintenance facilities to facilitate routine servicing, cleaning, storage, and repair of vehicles as well as the equipment and infrastructure for guideway maintenance along the IOS route:

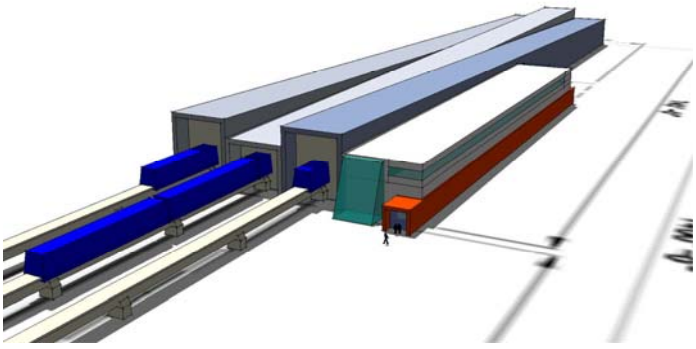
Central Maintenance Facility

The Central Maintenance Facility includes seven vehicle maintenance tracks, maintenance workshops, a vehicle washing facility, four parking tracks, offices, and the Maglev system operations control center. The proposed location for the Central Maintenance Facility is west of the Ontario International Airport.



Decentral Maintenance Facility

The Decentral Maintenance Facility provides a second location for minor vehicle maintenance and storage. It includes two vehicle maintenance tracks and one parking track. The proposed location for the Decentral Maintenance Facility is in West Los Angeles, on the opposite end of the Initial Operating Segment from the Central Maintenance Facility.



V. Refined Cost Estimates

Cost estimates have been developed for the three alignment options of the I-10, UPRR and SR-60. The costs provided are in year 2006 dollars and are based on recent industry experience relating to material and labor rates and available information from TRI-USA relating to maglev system component costs. Specific details of the unit costs and assumptions are provided in the Refined Cost Estimate report. The report provides information on the key components of the system which include:

- Structures/Foundations/Tunnels
- Earthwork
- Stations
- Parking Facilities
- Operation and Maintenance Facilities
- Guideway/ Propulsion/Power Supply/Operation Control (OCS)
- Sound Walls (Noise Protection)
- Safety Fencing/Landscape
- Maglev Vehicles
- ROW/Roadway Improvements/Utility Relocation/Traffic Control
- Contingencies, Project Implementation, and Environmental Mitigation

In summary, the cost for each alignment is summarized as the following:

- I-10 Alignment - $7.811 billion
- Union Pacific Railroad Alignment - $8.066 billion
- SR-60 Alignment - $8.177 billion

The following tables provide a more detailed summary of the cost for each of the three alignment options.

Table 1: I-10 Alignment

Item	Quantity	Unit	Unit Cost	Cost	Subtotal	Estimated Design/Constr. Contingencies	Estimated Program Implementation	Environmental Impact Mitigation	Contingencies, Management, & Mitigation Costs	Estimated Item/System Total Cost
Conversion from feet to meters	0.3048									
Conversion from miles to kilometers	1.6093									
Conversion from cubic yards (cu-yd) to cubic meters (cu-m)	0.7646									
Conversion from square feet (sq-ft) to square meters (sq-m)	0.0929									
Length of Alignment (miles)	54.44									
						10.0%	30.0%	3.0%	43.0%	
Guideway ==========>					**$ 1,085,492,300**	**$ 108,549,230**	**$ 325,647,690**	**$ 32,564,769**	**$ 466,761,689**	**$ 1,552,254,000**
Type 1 Guideway	534,100	LF	$ 1,943	$ 1,037,756,300						
Type 3 Guideway	40,800	LF	$ 1,170	$ 47,736,000						
						25.0%	30.0%	3.0%	58.0%	
Structures/Foundations/Tunnels ==========>					**$ 1,364,124,200**	**$ 341,031,050**	**$ 409,237,260**	**$ 40,923,726**	**$ 791,192,036**	**$ 2,155,316,200**
Substructure for Guideway Type 1 and 3	287,450	LF	$ 4,516	$ 1,298,124,200						
Elevated Walkways	20,000	LF	$ 800	$ 16,000,000						
Sound Walls	10,000	LF	$ 1,000	$ 10,000,000						
Tunnel substructure	-	LF	$ 15,000	$ -						
Retaining Walls	1	LS	$ 10,000,000	$ 10,000,000						
Ground Densification	1	each	$ 30,000,000	$ 30,000,000						
						25.0%	30.0%	3.0%	58.0%	
Stations/Maintenance Total Cost ==========>					**$ 803,917,376**	**$ 200,979,344**	**$ 241,175,213**	**$ 24,117,521**	**$ 466,272,078**	**$ 1,270,189,500**
Stations					$ 594,383,376					
Ontario Airport Station (Center Side Platform Mezzanine)	1	LS	$ 80,377,000	$ 80,377,000						
Ontario Airport Station Parking Structure	5927	Spaces	$ 19,173	$ 113,638,371						
West Covina Station (Center Platform)	1	LS	$ 44,184,000	$ 44,184,000						
West Covina Station Parking Structure	6368	Spaces	$ 19,173	$ 122,093,664						
Union Station (Center Side Platform Mezzanine)	1	LS	$ 80,377,000	$ 80,377,000						
Union Station Parking Structure	3500	Spaces	$ 19,173	$ 67,105,500						
West LA (Center Platform)	1	LS	$ 42,184,000	$ 42,184,000						
West LA Parking Structure	2317	Spaces	$ 19,173	$ 44,423,841						
Maintenance & Operations Facilities					$ 209,534,000					
Central Maintenance Facility & OCC (Building and Non-Maglev Equipment)	1	LS	$ 91,452,000	$ 91,452,000						
Decentral Maintenance Facility (Building and Non-Maglev Equipment)	1	LS	$ 27,332,000	$ 27,332,000						
Maglev Vehicle Equipment	1	LS	$ 70,000,000	$ 70,000,000						
Maglev Maintenance and Inspection Vehicles	1	LS	$ 10,000,000	$ 10,000,000						
Maglev Train Wash Facility	1	LS	$ 7,000,000	$ 7,000,000						
Parking Facility	250	LS	$ 15,000	$ 3,750,000						
						25.0%	30.0%	3.0%	58.0%	
Communications/Signal/Power ==========>					**$ 849,264,000**	**$ 212,316,000**	**$ 254,779,200**	**$ 25,477,920**	**$ 492,573,120**	**$ 1,341,837,100**
Power Substations/Distribution	54.44	Mile	$ 10,400,000	$ 566,176,000						
Operations/Control/Communications	54.44	Mile	$ 5,200,000	$ 283,088,000						
						10.0%	5.0%	0.0%	15.0%	
Vehicles Total Cost ==========>					**$ 800,800,000**	**$ 80,080,000**	**$ 40,040,000**	**$ -**	**$ 120,120,000**	**$ 920,920,000**
(8) Car Consists	10	each	$ 80,080,000	$ 800,800,000						
						0.0%	0.0%	0.0%	0.0%	
Right of Way ==========>					**$ 324,049,875**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 324,049,900**
Right of Way	1	LS	$ 324,049,875	$ 324,049,875						
						25.0%	30.0%	3.0%	58.0%	
Roadway Improvements/Utility Relocation/Traffic Control==========>					**$ 156,240,400**	**$ 39,060,100**	**$ 46,872,120**	**$ 4,687,212**	**$ 90,619,432**	**$ 246,859,800**
Roadway Improvements										
Roadway Improvements w/Drainage	1	LS	$ 45,000,000	$ 45,000,000						
Utility Relocation	1	LS	$ 50,000,000	$ 50,000,000						
Traffic Control During Construction (2.5% of structure+guideway)	1	LS	$ 61,240,400	$ 61,240,400						
					System Subtotal	**Estimated Design/Constr. Contingencies**	**Estimated Program Implementation**	**Environmental Impact Mitigation**	**Contingencies, Management, & Mitigation Costs**	**Estimated Item/System Total Cost**
Subtotal ==========>					**$ 5,383,888,151**	**$ 982,015,724**	**$ 1,317,751,483**	**$ 127,771,148**	**$ 2,427,538,355**	**$ 7,811,426,500**
Cost per Mile (Double Track System) ==========>					$ 98,895,815	$ 18,038,496	$ 24,205,575	$ 2,347,009	$ 44,591,079	$ 143,486,894

Table 2: SR-60 Alignment

Item	Quantity	Unit	Unit Cost	Cost	Subtotal	Estimated Design/Constr. Contingencies	Estimated Program Implementation	Environmental Impact Mitigation	Contingencies, Management, & Mitigation Costs	Estimated Item/System Total Cost
Conversion from feet to meters	0.3048									
Conversion from miles to kilometers	1.6093									
Conversion from cubic yards (cu-yd) to cubic meters (cu-m)	0.7646									
Conversion from square feet (sq-ft) to square meters (sq-m)	0.0929									
Length of Alignment (miles)	58.37									
						10.0%	30.0%	3.0%	43.0%	
Guideway ==========>					$ 1,166,126,800	$ 116,612,680	$ 349,838,040	$ 34,983,804	$ 501,434,524	$ 1,667,561,300
Type 1 Guideway	575,600	LF	$ 1,943	$ 1,118,390,800						
Type 3 Guideway	40,800	LF	$ 1,170	$ 47,736,000						
						25.0%	30.0%	3.0%	58.0%	
Structures/Foundations/Tunnels ==========>					$ 1,545,797,684	$ 386,449,421	$ 463,739,305	$ 46,373,931	$ 896,562,657	$ 2,442,360,300
Substructure for Guideway Type 1 and 3	288,970	LF	$ 4,813	$ 1,390,679,684						
Elevated Walkways	20,760	LF	$ 800	$ 16,608,000						
Sound Walls	10,310	LF	$ 1,000	$ 10,310,000						
Tunnel substructure	5,880	LF	$ 15,000	$ 88,200,000						
Retaining Walls	1	LS	$ 10,000,000	$ 10,000,000						
Ground Densification	1	each	$ 30,000,000	$ 30,000,000						
						25.0%	30.0%	3.0%	58.0%	
Stations/Maintenance Total Cost ==========>					$ 791,187,744	$ 197,796,936	$ 237,356,323	$ 23,735,632	$ 458,888,892	$ 1,250,076,600
Stations					$ 581,653,744					
Ontario Airport Station (Center Side Platform Mezzanine)	1	LS	$ 80,377,000	$ 80,377,000						
Ontario Airport Station Parking Structure	5927	Spaces	$ 19,173	$ 113,638,371						
Puente Hills Station (Center Platform)	1	LS	$ 44,184,000	$ 44,184,000						
Puente Hills Station Parking Structure	6368	Spaces	$ 17,174	$ 109,364,032						
Union Station (Center Side Platform Mezzanine)	1	LS	$ 80,377,000	$ 80,377,000						
Union Station Parking Structure	3500	Spaces	$ 19,173	$ 67,105,500						
West LA (Center Platform)	1	LS	$ 42,184,000	$ 42,184,000						
West LA Parking Structure	2317	Spaces	$ 19,173	$ 44,423,841						
Maintenance & Operations Facilities					$ 209,534,000					
Central Maintenance Facility & OCC (Building and Non-Maglev Equipment)	1	LS	$ 91,452,000	$ 91,452,000						
Decentral Maintenance Facility (Building and Non-Maglev Equipment)	1	LS	$ 27,332,000	$ 27,332,000						
Maglev Vehicle Equipment	1	LS	$ 70,000,000	$ 70,000,000						
Maglev Maintenance and Inspection Vehicles	1	LS	$ 10,000,000	$ 10,000,000						
Maglev Train Wash Facility	1	LS	$ 7,000,000	$ 7,000,000						
Parking Facility	250	LS	$ 15,000	$ 3,750,000						
						25.0%	30.0%	3.0%	58.0%	
Communications/Signal/Power ==========>					$ 910,572,000	$ 227,643,000	$ 273,171,600	$ 27,317,160	$ 528,131,760	$ 1,438,703,800
Power Substations/Distribution	58.37	Mile	$ 10,400,000	$ 607,048,000						
Operations/Control/Communications	58.37	Mile	$ 5,200,000	$ 303,524,000						
						10.0%	5.0%	0.0%	15.0%	
Vehicles Total Cost ==========>					$ 800,800,000	$ 80,080,000	$ 40,040,000	$ -	$ 120,120,000	$ 920,920,000
(8) Car Consists	10	each	$ 80,080,000	$ 800,800,000						
						0.0%	0.0%	0.0%	0.0%	
Right of Way ==========>					$ 339,076,125	$ -	$ -	$ -	$ -	$ 339,076,100
Right of Way	1	LS	$ 339,076,125	$ 339,076,125						
						25.0%	30.0%	3.0%	58.0%	
Roadway Improvements/Utility Relocation/Traffic Control==========>					$ 162,798,100	$ 40,699,525	$ 48,839,430	$ 4,883,943	$ 94,422,898	$ 257,221,000
Roadway Improvements										
Roadway Improvements w/Drainage	1	LS	$ 45,000,000	$ 45,000,000						
Utility Relocation	1	LS	$ 50,000,000	$ 50,000,000						
Traffic Control During Construction (2.5% of structure+guideway)	1	LS	$ 67,798,100	$ 67,798,100						
					System Subtotal	Estimated Design/Constr. Contingencies	Estimated Program Implementation	Environmental Impact Mitigation	Contingencies, Management, & Mitigation Costs	Estimated Item/System Total Cost
Subtotal ==========>					$ 5,716,358,453	$ 1,049,281,562	$ 1,412,984,698	$ 137,294,470	$ 2,599,560,730	$ 8,315,919,100
Cost per Mile (Double Track System) ==========>					$ 97,933,158	$ 17,976,384	$ 24,207,379	$ 2,352,141	$ 44,535,904	$ 142,469,061

Table 3: UPRR Alignment

Item	Quantity	Unit	Unit Cost	Cost	Subtotal	Estimated Design/Constr. Contingencies	Estimated Program Implementation	Environmental Impact Mitigation	Contingencies, Management, & Mitigation Costs	Estimated Item/System Total Cost
Conversion from feet to meters	0.3048									
Conversion from miles to kilometers	1.6093									
Conversion from cubic yards (cu-yd) to cubic meters (cu-m)	0.7646									
Conversion from square feet (sq-ft) to square meters (sq-m)	0.0929									
Length of Alignment (miles)	56.33									
						10.0%	30.0%	3.0%	43.0%	
Guideway ==========>					$ 1,133,878,580	$ 113,387,858	$ 340,163,574	$ 34,016,357	$ 487,567,789	$ 1,621,446,400
Type 1 Guideway	566,560	LF	$ 1,943	$ 1,100,826,080						
Type 3 Guideway	28,250	LF	$ 1,170	$ 33,052,500						
						25.0%	30.0%	3.0%	58.0%	
Structures/Foundations/Tunnels ==========>					$ 1,454,987,650	$ 363,746,913	$ 436,496,295	$ 43,649,630	$ 843,892,837	$ 2,298,880,500
Substructure for Guideway Type 1 and 3	297,410	LF	$ 4,665	$ 1,387,417,650						
Elevated Walkways	20,900	LF	$ 800	$ 16,720,000						
Sound Walls	10,400	LF	$ 1,000	$ 10,400,000						
Tunnel substructure	-	LF	$ 15,000	$ -						
Retaining Walls	1	LS	$ 10,450,000	$ 10,450,000						
Ground Densification	1	each	$ 30,000,000	$ 30,000,000						
						25.0%	30.0%	3.0%	58.0%	
Stations/Maintenance Total Cost ==========>					$ 801,917,376	$ 200,479,344	$ 240,575,213	$ 24,057,521	$ 465,112,078	$ 1,267,029,500
Stations					$ 592,383,376					
Ontario Airport Station (Center Side Platform Mezzanine)	1	LS	$ 80,377,000	$ 80,377,000						
Ontario Airport Station Parking Structure	5927	Spaces	$ 19,173	$ 113,638,371						
Industry Station (Center Platform)	1	LS	$ 42,184,000	$ 42,184,000						
Industry Station Parking Structure	6368	Spaces	$ 19,173	$ 122,093,664						
Union Station (Center Side Platform Mezzanine)	1	LS	$ 80,377,000	$ 80,377,000						
Union Station Parking Structure	3500	Spaces	$ 19,173	$ 67,105,500						
West LA (Center Platform)	1	LS	$ 42,184,000	$ 42,184,000						
West LA Parking Structure	2317	Spaces	$ 19,173	$ 44,423,841						
Maintenance & Operations Facilities					$ 209,534,000					
Central Maintenance Facility & OCC (Building and Non-Maglev Equipment)	1	LS	$ 91,452,000	$ 91,452,000						
Decentral Maintenance Facility (Building and Non-Maglev Equipment)	1	LS	$ 27,332,000	$ 27,332,000						
Maglev Vehicle Equipment	1	LS	$ 70,000,000	$ 70,000,000						
Maglev Maintenance and Inspection Vehicles	1	LS	$ 10,000,000	$ 10,000,000						
Maglev Train Wash Facility	1	LS	$ 7,000,000	$ 7,000,000						
Parking Facility	250	LS	$ 15,000	$ 3,750,000						
						25.0%	30.0%	3.0%	58.0%	
Communications/Signal/Power ==========>					$ 878,696,591	$ 219,674,148	$ 263,608,977	$ 26,360,898	$ 509,644,023	$ 1,388,340,600
Power Substations/Distribution	56.33	Mile	$ 10,400,000	$ 585,797,727						
Operations/Control/Communications	56.33	Mile	$ 5,200,000	$ 292,898,864						
						10.0%	5.0%	0.0%	15.0%	
Vehicles Total Cost ==========>					$ 800,800,000	$ 80,080,000	$ 40,040,000	$ -	$ 120,120,000	$ 920,920,000
(8) Car Consists	10	each	$ 80,080,000	$ 800,800,000						
						0.0%	0.0%	0.0%	0.0%	
Right of Way ==========>					$ 314,461,250	$ -	$ -	$ -	$ -	$ 314,461,300
Right of Way	1	LS	$ 314,461,250	$ 314,461,250						
						25.0%	30.0%	3.0%	58.0%	
Roadway Improvements/Utility Relocation/Traffic Control==========>					$ 161,721,700	$ 40,430,425	$ 48,516,510	$ 4,851,651	$ 93,798,586	$ 255,520,300
Roadway Improvements										
Roadway Improvements w/Drainage	1	LS	$ 47,000,000	$ 47,000,000						
Utility Relocation	1	LS	$ 50,000,000	$ 50,000,000						
Traffic Control During Construction (2.5% of structure+guideway)	1	LS	$ 64,721,700	$ 64,721,700						
					System Subtotal	Estimated Design/Constr. Contingencies	Estimated Program Implementation	Environmental Impact Mitigation	Contingencies, Management, & Mitigation Costs	Estimated Item/System Total Cost
Subtotal ==========>					$ 5,546,463,147	$ 1,017,798,687	$ 1,369,400,569	$ 132,936,057	$ 2,520,135,313	$ 8,066,598,600
Cost per Mile (Double Track System) ==========>					$ 98,469,513	$ 18,069,559	$ 24,311,747	$ 2,360,089	$ 44,741,395	$ 143,210,910

VI. Outreach and Communications

The outreach and communications conducted for the SCAG Phase 2 Maglev Deployment focused on providing information to key stakeholders along the alignment. The goal was to obtain input from stakeholders that would help in the preliminary engineering of the project. Due to the limitations of the scope and the current point in the development of the program, the outreach effort was conducted at a very high-level. Future phases of the program will address the need to conduct outreach at a level necessary for environmental impact analysis and clearance.

Key local stakeholders within each project segment were identified early on for the Outreach and Communications effort[3]. Agency representatives, civic leaders, elected officials and key staffers from local governments within these geographic segments were briefed. Additional stakeholders such as developers and other economic interests were also provided detailed presentations as warranted. Municipal and civic stakeholders are identified in their capacities as either key policy makers or leaders of active organizations or those organizations themselves, with a focus on business and economic development, transportation and land use advocacy. In all briefings, comments and concerns were noted.

Stakeholder Meetings

Meetings for Maglev Phase 2 focused on stakeholders at potential station sites along the alignment. Thus, it was especially important to brief those stakeholders representing the cities of Los Angeles, West Covina, Industry (an alternative to the West Covina station site) and Ontario, though stakeholders representing jurisdictions along that alignment will also be identified.

The meetings and presentations focused on technical information related to the maglev project. The briefings were not intended to be lobbying efforts or attempts to obtain endorsement for the project but rather to obtain or offer information related to the engineering of the system and the proposed stations.

Key briefings included the following:

- California Department of Transportation (District Director Failing and staff, see Preliminary Engineering Analysis Milestone Report)
- City of Los Angeles Department of Transportation (General Manager Gloria Jeff and staff)
- City of Los Angeles Councilman Rosendahl (11th District)
- City of Los Angeles Councilman Smith (12th District, member of Maglev Task Force)
- City of Los Angeles Councilman Parks (8th District)
- County of Los Angeles Supervisor Burke (2nd District)
- City of Ontario (Mayor Pro Tem Wapner, Member of Maglev Task Force and staff)
- City of West Covina (Mayor Herfert, Mayor Pro Tem Touhey, and staff)
- City of San Gabriel (Councilman Baldwin, SCAG Transportation Committee Chair)
- City of Industry (staff)
- City of Pomona (staff)
- City of Torrance (Mayor Pro Tem Nowatka)
- Los Angeles World Airports Board
- City of Palms Springs (staff)
- Agua Caliente Tribe (Council Chairman Malanovich and staff)
- Pechanga Tribe (Boardmember Palinkas)
- Westfield Developments (owners of West Covina mall station site)

[3] SCAG Phase 2 Maglev Deployment Program, Draft Public Involvement Plan, September 2005

Station Siting Workshops were conducted as a part of the briefings as appropriate. These revolved around identifying the parameters with which stations and maintenance facilities can be investigated. Follow up briefings were conducted to share results of the conceptual work.

Maglev Task Force

Regular updates were provided to the Maglev Task Force (MTF) concerning the progress of the technical work. Presentations were made in the form of Powerpoint slideshows. Additionally, summary presentations were made to the MTF prior to their adoption of a deliverable on the project.

Collateral Material Development

As noted, powerpoint presentations were developed for the briefings which were also used as a “leave behinds”. In addition, previously developed fact sheets were also provided.

VII. Appendices

Task Force Meeting Presentations

Program Fact Sheets